WHAT IS CLAIMED:

1. A plasma reactor comprising:

a process chamber;

a chuck assembly;

a plasma source assembly;

a holding structure constructed and arranged to hold said plasma source assembly, said holding structure at least partially constitutes a wall of said process chamber; and

a support structure constructed and arranged to support said chuck assembly,

wherein said support assembly is constructed and arranged to raise and lower said chuck assembly relative to said plasma source assembly.

2. A plasma reactor as recited in claim 1, wherein said plasma source assembly is a capacitively coupled plasma (CCP) source assembly.

3. A plasma reactor as recited in claim 2, wherein said capacitively coupled plasma (CCP) source assembly comprises an electrode assembly constructed and arranged adjacent to the chuck assembly, said electrode assembly and said chuck assembly defining a plasma region therebetween.

4. A plasma reactor as recited in claim 1, wherein said plasma source assembly is an inductively coupled plasma (ICP) source assembly.

5. A plasma reactor as recited in claim 4, wherein said inductively coupled plasma source assembly comprises an inductive coil.

6. A plasma reactor as recited in claim 1, wherein said plasma source assembly is an electrostatically shielded radio frequency (ESRF) plasma source assembly.

7. A plasma reactor as recited in claim 6, wherein said electrostatically shielded radio frequency (ESRF) plasma source assembly comprises a coil provided in the vicinity of a said chuck assembly.

8. A plasma reactor as recited in claim 1, wherein said plasma source assembly is an electron cyclotron resonance plasma source assembly.

9. A plasma reactor as recited in claim 1, wherein said plasma source assembly is a helicon plasma source assembly.

10. A plasma reactor as recited in claim 1, further comprising a plasma source impedance match network held by said holding structure.

11. A plasma reactor as recited in claim 10, wherein said plasma source impedance match network is electrically coupled to said plasma source assembly.

12. A plasma reactor as recited in claim 1, further comprising a chuck impedance match network supported by said support structure.

13. A plasma reactor as recited in claim 12, wherein said chuck impedance match network is electrically coupled to said chuck assembly.

14. A plasma reactor as recited in claim 13,

wherein said chuck impedance match network is constructed and arranged to provide radio-frequency bias connection to said chuck assembly.

15. A plasma reactor as recited in claim 1, further comprising:

a utility via assembly constructed and arranged to provide utilities to said chuck assembly.

16. A plasma reactor as recited in claim 15, wherein said utilities include cooling systems and temperature regulating systems.

17. A plasma reactor as recited in claim 1, further comprising:

a gas supply system in communication with said plasma vacuum chamber, said gas supply system being constructed and arranged to supply a gas into said plasma vacuum chamber.

18. A plasma reactor as recited in claim 17, wherein said gas includes at least one of hydrogen-bromide, octafluorocyclobutane, fluorocarbon compounds, silane, tungsten-pentafluoride, and titanium-tetrachloride.

19. A plasma reactor as recited in claim 1, further comprising:

a robotic system in operative communication with said plasma vacuum chamber, said robotic system being constructed and arranged to transport a workpiece to and from the chuck assembly.

20. A plasma reactor as recited in claim 19, further comprising:

a robotic chamber; and

a valve,

wherein said robotic system is arranged in said robotic chamber, said robotic chamber and said vacuum chamber are isolated with said valve.

21. A plasma reactor as recited in claim 1, wherein said vacuum chamber comprises sidewalls and a chamber adapter constructed and arranged to hold a vacuum pump adapted to evacuate gases from said vacuum chamber.

22. A plasma reactor as recited in claim 21, wherein said vacuum pump is a turbo molecular pump (TMP).

23. A plasma reactor as recited in claim 21, wherein said vacuum pump is arranged symmetrically to an axis perpendicular to said chuck assembly, said axis passing through approximately a center of said chuck assembly such that pumping of said gases is symmetrical relative to said axis.

24. A plasma reactor as recited in claim 21, wherein a space around an opening in vacuum pump and around said chuck assembly is substantially unobstructed thereby allowing pumping symmetrically.

25. A plasma reactor as recited in claim 1, further comprising:

a chamber plate constructed and arranged to inject gases in the vicinity and opposite the chuck assembly.

26. A plasma reactor as recited in claim 25, wherein said chamber plate is held by said holding structure.

27. A plasma reactor as recited in claim 1, wherein said chuck assembly is constructed and arranged to hold a workpiece.

28. A plasma reactor as recited in claim 1, wherein said holding structure is constructed and arranged to pivot around a pivot point relative to a wall of said process chamber.

29. A plasma reactor as recited in claim 1, wherein said holding structure is constructed and arranged to pivot around a pivot axis parallel to a surface of said holding structure.

30. A plasma reactor as recited in claim 1, wherein said support structure comprises:

an actuation assembly; and

a support mechanism coupled to said actuation assembly and to said chuck assembly.

31. A plasma reactor as recited in claim 30, wherein said support structure further comprises a bellows assembly positioned around said support mechanism and arranged to allow free movement of said support mechanism relative to said chuck assembly.

32. A plasma a reactor as recited in claim 31, wherein said support mechanism is coupled through said bellows assembly to said actuation assembly and said bellows is external to said process chamber.

33. A plasma reactor as recited in claim 30, wherein said actuation assembly comprises a lift mechanism disposed below said process chamber.

34. A plasma reactor as recited in claim 30, wherein said actuation assembly comprises a lift mechanism disposed above said process chamber.

35. A method for varying the space between a plasma source assembly and a chuck assembly, the plasma source assembly being held by a holding structure and the chuck assembly being held by a support structure, the method comprising:

raising or lowering said chuck assembly relative to said plasma source assembly by using a lift mechanism, said lift mechanism being coupled to said support structure.